



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/938,399	08/23/2001	Michael Barnes	A4944/139900	9940
32588	7590	11-25/2003		
APPLIED MATERIALS, INC. 2881 SCOTT BLVD. M/S 2061 SANTA CLARA, CA 95050			EXAMINER MOORE, KARLA A	
			ART UNIT	PAPER NUMBER

1763

DATE MAILED: 11/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/938,399

Applicant(s)

BARNES ET AL.

Examiner

Karla Moore

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-15,24 and 25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-15,24 and 25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3 and 6-10 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,451,118 to Garriga in view of U.S. Patent No. 6,342,275 to Miyakawa et al.

3. Garriga discloses an apparatus capable of forming a first dielectric layer and a second layer on a semiconductor substrate in Figure 5 substantially as claimed, the apparatus comprising: a first atmospheric deposition station (552; column 6, rows 48-54) capable of accommodating a first material for forming a first dielectric layer on a semiconductor substrate; a second atmospheric deposition station (556) comprising an atmospheric pressure vapor deposition chamber (column 5, rows 45-49 and column 6, rows 34-38) and capable of accommodating a second material for forming a second layer on a semiconductor substrate, wherein the first atmospheric station and the second atmospheric deposition station are coupled together; and a substrate handling system (516 and 518) adapted to transfer the substrate into and out of the first atmospheric deposition station and the second atmospheric deposition station. Examiner has arbitrarily picked numbers for the processing chambers above from the chambers illustrated in Figure 5a, as Garriga teaches that any of the chambers may be constructed to perform the processes set forth in the disclosure. The apparatus of Garriga is suitable for use in manufacturing semiconductors (column 3, row 65 through column 4, rows 1).

4. However, Garriga fails to teach a plasma system associated with the atmospheric deposition chamber.

5. Miyakawa et al. teach the use of an atmospheric deposition apparatus comprising a plasma system supplying an active gas for the purpose of forming a film with various desirable properties, such

as water repellency, hydrophilic properties or high hardness (abstract). The apparatus of Miyakawa et al. is suitable for use in manufacturing semiconductors (column 1, rows 16-19).

6. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an atmospheric deposition apparatus comprising a plasma system supplying an active gas in Garriga in order to form a film with various desirable properties, such as water repellency, hydrophilic properties or high hardness as taught by Miyakawa et al.

7. With respect to claim 3, any of the four atmospheric deposition stations may be configured to comprise an ultrasonic spray deposition device (column 5, rows 55-57).

8. With respect to claim 6, any of the processing stations (atmospheric or vacuum) could be used as a curing station (column 5, rows 50-54 and column 6, rows 5-6). Although the "curing station" is described as a "heating" station by Garriga, it can also be considered to be a curing chamber, where "cure" is defined by Merriam-Webster as "to prepare or alter especially by chemical or physical processing for keeping or use".

9. With respect to claims 7 and 8, the courts have ruled that expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969).

10. With respect to claim 9, the atmospheric vapor deposition chamber is an atmospheric chemical vapor deposition chamber (column 5, rows 45-49).

11. With respect to claim 10, though not explicitly disclosed, the first atmospheric deposition station would inherently comprise a liquid dispenser for any liquid treatment to be performed on the substrate (column 5, rows 40-44 and column 5, rows 29-33).

12. Claims 2 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garriga and Miyakawa et al. as applied to claims 1, 3 and 6-10 above, and further in view of U.S. Patent No. 5,562,772 to Neoh.

Art Unit: 1763

13. Garriga and Miyakawa et al. disclose the invention substantially as claimed and as described above. Garriga further discloses the apparatus comprising: an annealing chamber (554), a silylation chamber (550) and a curing chamber (any one of 520, 522, 524 or 526).

14. However, Garriga and Miyakawa et al. fail to teach the first atmospheric deposition station housing a spin coater.

15. Neoh teaches the use of a spin coater for the purpose of forming a coating layer that has uniform thickness and is substantially free of bubbles (column 1, rows 60-64).

16. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to provided a spin coater in the atmospheric deposition chamber in Garriga and Miyakawa et al. in order to form a coating layer that has uniform thickness and is substantially free of bubbles as taught by Neoh.

17. Claims 5 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garriga and Miyakawa et al. as applied to claims 1, 3 and 6-10 above, and further in view of U.S. Patent No. 5,337,362 to Imahashi.

18. Garriga and Miyakawa et al. disclose the invention substantially as claimed and as described above.

19. However, the Garriga and Miyakawa et al. fail to teach a remote plasma system adapted to generate a plasma upstream of the atmospheric chemical vapor deposition chamber.

20. Imahashi et al. teach the use of a remote plasma system associated with a deposition chamber in a multiple chamber system for the purpose of preventing ions from being supplied to the deposition chamber and causing damage to a substrate (column 2, rows 42-47 and column 6, rows 14-34).

21. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a remote plasma system in Garriga and Miyakawa et al. in order to prevent ions from being supplied to a deposition chamber and causing damage to a substrate as taught by Imahashi et al.

Art Unit: 1763

22. Claims 11, 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,451,118 to Garriga in view of U.S. Patent No. 6,342,275 to Miyakawa et al. and U.S. Patent No. 5,562,772 to Neoh.

23. Garriga discloses the invention substantially as claimed and comprising: an apparatus capable of forming a first porous dielectric layer and a second layer on a semiconductor substrate in Figure 5 substantially as claimed, the apparatus comprising: an atmospheric chemical vapor deposition chamber (556); a coating chamber (552) coupled to the atmospheric chemical vapor deposition chamber; a curing station (any one of 520, 522, 524 or 526) coupled to the atmospheric chemical vapor deposition chamber; and a substrate handling system (516 and 518) adapted to transfer substrates between the atmospheric chemical vapor deposition chamber, the coating chamber and the curing station. The apparatus of Garriga is suitable for use in manufacturing semiconductors (column 3, row 65 through column 4, rows 1).

24. However, Garriga fails to teach a plasma system associated with the atmospheric deposition chamber.

25. Miyakawa et al. teach the use of an atmospheric deposition apparatus comprising a plasma system supplying an active gas for the purpose of forming a film with various desirable properties, such as water repellency, hydrophilic properties or high hardness (abstract). The apparatus of Miyakawa et al. is suitable for use in manufacturing semiconductors (column 1, rows 16-19).

26. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an atmospheric deposition apparatus comprising a plasma system supplying an active gas in Garriga in order to form a film with various desirable properties, such as water repellency, hydrophilic properties or high hardness as taught by Miyakawa et al.

27. Garriga and Miyakawa et al. disclose the invention substantially as claimed and as described above.

28. However, Garriga and Miyakawa et al. fail to teach the coating station housing a spin coater.

29. Neoh teaches the use of a spin coater for the purpose of forming a coating layer that has uniform thickness and is substantially free of bubbles (column 1, rows 60-64).

30. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to provide a spin coater in the atmospheric deposition chamber in Garriga and Miyakawa et al. in order to form a coating layer that has uniform thickness and is substantially free of bubbles as taught by Neoh.

31. With respect to the recitations drawn to the material used during an intended use of the apparatus, the courts have ruled expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969).

32. With respect to claim 13, the substrate handling system comprises a plurality of substrate handlers (516 and 518) with arms.

33. With respect to claim 14 and 15, the apparatus is a cluster tool (abstract).

34. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Garriga, Miyakawa et al. and Neoh as applied to claims 11 and 13-15 above, and further in view of U.S. Patent No. 5,337,362 to Imahashi.

35. Garriga, Miyakawa et al. and Neoh disclose the invention substantially as claimed and as described above.

36. However, Garriga, Miyakawa et al. and Neoh fail to teach a remote plasma system adapted to generate a plasma upstream of the atmospheric chemical vapor deposition chamber.

37. Imahashi et al. teach the use of a remote plasma system associated with a deposition chamber in a multiple chamber system for the purpose of preventing ions from being supplied to the deposition chamber and causing damage to a substrate (column 2, rows 42-47 and column 6, rows 14-34).

38. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a remote plasma system in Garriga, Miyakawa et al. and Neoh in order to prevent ions from being supplied to a deposition chamber and causing damage to a substrate as taught by Imahashi et al.

Response to Arguments

39. Applicant's arguments with respect to the rejections based on the combinations of Yamada et al. with Hayashi et al. and Garriga with Hayashi et al. have been considered but are moot in view of the new ground(s) of rejection.

40. Applicant's arguments filed 9/18/2003, with respect to the use of Garriga have been fully considered but they are not persuasive. Applicant argues that Garriga fails to teach an apparatus capable of deposition. Examiner disagrees. Garriga discloses at column 3, rows 62 through column 4, rows 1, that the main feature of the invention is that the apparatus is capable of providing "any known semiconductor process". One of ordinary skill in the art would clearly recognize that this includes deposition processes. Further, at column 3, rows 36-42, Garriga states that the apparatus can comprise "atmospheric-compatible or chemical process steps". Again, this would indicate to one of ordinary skill in that the apparatus is capable of deposition processes, as clearly deposition is included in this definition. Examiner recognizes that the disclosure fails to explicitly state that the apparatus is capable of deposition processes. However, the processes explicitly mentioned in the disclosure and Applicants Remarks (i.e. etching and rinsing) are clearly disclosed as non-limiting examples and one of ordinary skill in the art would recognize that as structurally disclosed in column 5, rows 33-57 the chamber would be capable of deposition, as well.

Conclusion

50. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 703.305.3142. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703.308.1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703.872.9310 for regular communications and 703.872.9311 for After Final communications.

Application/Control Number: 09/938,399

Page 8

Art Unit: 1763

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

km

November 18, 2003

primary Examiner
Art 1763
P. Hatanzi-del